JUL 21 1982

1051.H.11 Y3.N88:25/2572

NUREG/CR-2572
SAND81-2502
R7
Printed May 1982

ORIGINAL

COMPLETED

Quality Assurance Program Plan for the Reactor Research Experiment Programs (RREP)

27

D. G. Pipher

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550
for the United States Department of Energy
under Contract DE-AC04-76DP00789

Prepared for
U. S. NUCLEAR REGULATORY COMMISSION

SF2900Q(8-81)

NOTICE

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, or any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use, or the results of such use, of any information, apparatus product or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights.

Available from

GPO Sales Program
Division of Technical Information and Document Control
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

and

National Technical Information Service
Springfield, Virginia 22161

NUREG/CR-2572
SAND81-2502
R7

QUALITY ASSURANCE PROGRAM PLAN

FOR THE

REACTOR RESEARCH EXPERIMENT PROGRAMS (RREP)

D. G. Pipher

Sandia National Laboratories
Albuquerque, New Mexico 87185
operated by
Sandia Corporation
for the
U. S. Department of Energy

Manuscript Submitted: November 1981
Date Published: May 1982

Prepared for
Division of Reactor Safety Research
Office of Nuclear Regulatory Research
U. S. Nuclear Regulatory Commission
Washington, DC 20555
Under Memorandum of Understanding DOE 40-550-75
NRC FIN No. A-1016

BLANK PAGE

SAND81-2502

QUALITY ASSURANCE PROGRAM PLAN

for the

REACTOR RESEARCH EXPERIMENT PROGRAMS (RREP)

Sandia Laboratories

Albuquerque, NM 87185

Prepared By:

D. G. Pipher, 4423

Approved: _____
J. W. Walker, Manager
Advanced Reactor Research
Department 4420

Approved: _____
J. A. Reuscher, Manager
Reactor Development &
Applications
Department 4450

BLANK PAGE

CONTENTS

		Page
	Introduction	1
	Policy	1
	Definitions	2
I.	Organization	3
II.	Quality Assurance Program	9
III.	Design Information, Review and Change Control	11
IV.	Procurement Document Control	12
V.	Instructions, Procedures, and Drawings	13
VI.	Document Control	13
VII.	Control of Purchased Material, Equipment and Services	14
VIII.	Identification and Control of Materials, Parts and Components	16
IX.	Control of Special Processes	16
X.	Inspection	17
XI.	Test Control	17
XII.	Control of Measuring and Test Equipment	18
XIII.	Handling, Storage, and Shipping	19
XIV.	Inspection, Test, and Operating Status	20
XV.	Nonconforming Material	20
XVI.	Corrective Action	21
XVII.	Quality Records	22
XVIII.	Audits	22
	Appendix A -- Applicable Documentation	23

BLANK PAGE

SANDIA REACTOR RESEARCH EXPERIMENT PROGRAM (RREP)

QUALITY ASSURANCE PROGRAM PLAN

Introduction

This document describes the Quality Assurance Program plans which will be applied to tasks on Reactor Research Experiments performed on Sandia National Laboratories' reactors. The program provides for individual project or experiment quality plan development and allows for reasonable plan flexibility and maximum plan visibility. Various controls and requirements in this program plan are considered mandatory on all features which are identified as important to public health and safety (Level I). For definition of Quality Levels, see RREP II-3 listed in Appendix A.

It is the intent of this document that the Quality Assurance program comprise those elements which will provide adequate assurance that all components, equipment, and systems of the experiments will perform as designed, and hence prevent delays and costs due to rejections or failures.

This plan has been developed to support the Reactor Research Experiments response to the quality criteria contained in the code of Federal Regulations Title 10, part 50, Appendix B (10CFR50 Appendix B) as they relate to research and development in the nuclear field. This plan is also intended to meet the requirements of ANSI/N402-1976, entitled, "Quality Assurance Program Requirements for Research Reactors".

Procedures applicable to the RREP projects and experiments are considered necessary to describe the methods used by SNLA to implement requirements. Although some of these procedures address areas which have not previously been of direct concern to SNLA, a great majority of them are adapted from normal SNLA operational instructions to minimize perturbations to the manner in which Sandia conducts business.

Policy

It is a primary objective of Sandia National Laboratories to support nuclear research and development with quality assurance programs that are commensurate with the importance of the task and its potential impact on environment, health and safety. Specifically, the quality assurance program for all Nuclear Reactor Research programs, projects, and experiments shall, in addition to applying normal Sandia QA practices to all aspects of these tasks, be sufficient to comply with appropriate governmental regulations. In the accomplishment of this objective, Sandia will assign the talents and resources necessary to develop and implement an effective and economic quality assurance program.

Definitions

Terms and definitions, as used in this quality program plan, shall conform with ANSI N45.2.10--1973, "Quality Assurance Terms and Definitions," unless otherwise noted. The following definitions shall also apply:

Archive Samples: A record in the form of materials, i.e., samples of materials, not intended for use, but which are to be retained (on a long term basis) for possible use in the establishment or re-establishment of the identity (with particular regard to commercial materials) of materials that are used on important projects or experimental tests. Also, samples which can be used as comparison samples to establish acceptability criteria for new purchases.

Calibration: The comparison of a device with an appropriate standard of known and higher accuracy or closer tolerance to detect, quantify, correlate, report, and/or eliminate by adjustment any variation in the accuracy of the device being compared.

Code: A document established by regulatory authorities or government agencies, usually possessing statutory authority. A code prescribes requirements based on certain considerations (frequently public health and safety) and establishes the basic criteria, i.e., Code of Federal Regulations, CFR.

Corrective Action: Proper disposition of the item(s) and/or service(s) affected by a nonconformance, and the action that is being, will be, or has been taken to correct the adverse condition(s) and prevent recurrence.

Department Manager: At Sandia, these persons are the managers of the RREP Departments 4420 and 4450.

Design Review: A deliberately critical examination and evaluation ensuring that designs (e.g., drawings, specifications, calculations, theoretical analyses, and qualification tests) clearly, accurately, and completely describe technical requirements of the item in sufficient detail for the appropriate design phase. Cursory supervisory reviews and design checks do not satisfy the intent of a design review. An independent design review is one performed by individuals or groups other than those who performed the original design, but may be from within the designer's organization. An external design review is an independent design review performed by an organization other than that of the designer.

Division Supervisor: A supervisor in one of the divisions of a department.

File Administrator: A division member who controls the division project/experiment record file.

Material: Used in a very broad sense in this QAPP and includes assemblies, components, equipment, instruments, parts, product, structures, systems, etc. It does not include services.

Peer Review: Review performed by individuals not responsible for the activity, data, or documentation being reviewed. Peer reviewers should have sufficient technical expertise to provide an in-depth technical critique of the work under review. Particular emphasis during peer review should be on assumptions, extrapolations, and judgments that are made.

Project Leader/Experimenter: A lead engineer reporting to an RREP division supervisor.

Quality Coordinator: A person designated by the Department Manager to administer and implement the Quality Assurance Program with proper authorities and responsibilities delegated thereto.

Record: Any book, paper, drawing, map, photograph, specification, brochure, punch card, magnetic tape, paper tape, sound recording, pamphlet, slide, motion picture, or other documentary material, regardless of form or characteristics.

Safety-Related Materials/Features: Safety-related materials/-features are those related to the capability of the subject at hand to prevent or mitigate the consequences of an accident or failure which would release radionuclides to the biosphere. Such features are identified as Level I.

Scope of Work: A document which defines the task to be done and requirements to be met.

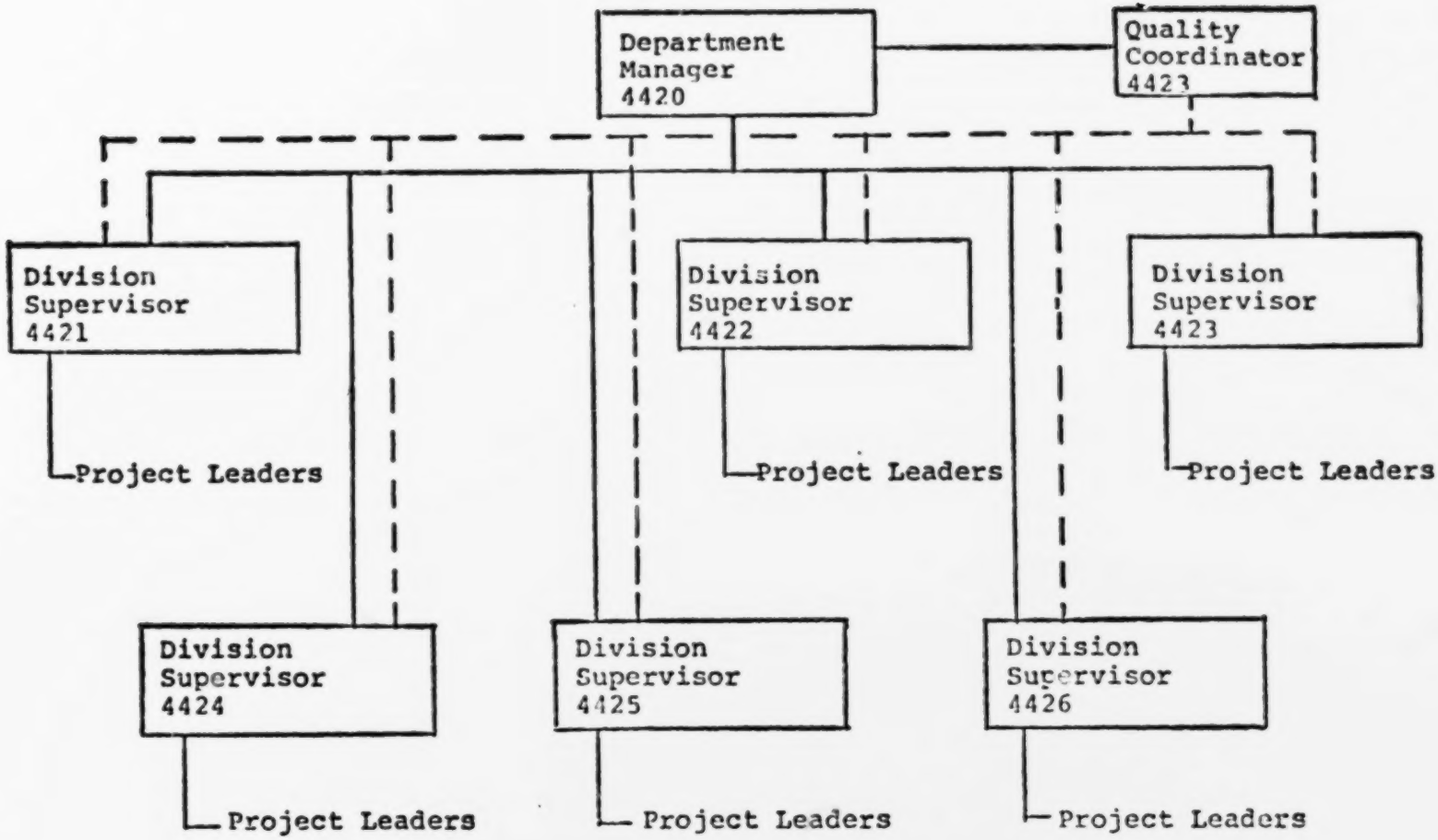
Standard: A set of values, procedures, methods, practices, or techniques established by general consent, custom, or authority to describe technical limitations and application for a material, product, item, or service.

I. ORGANIZATION

1. Organizational Structure

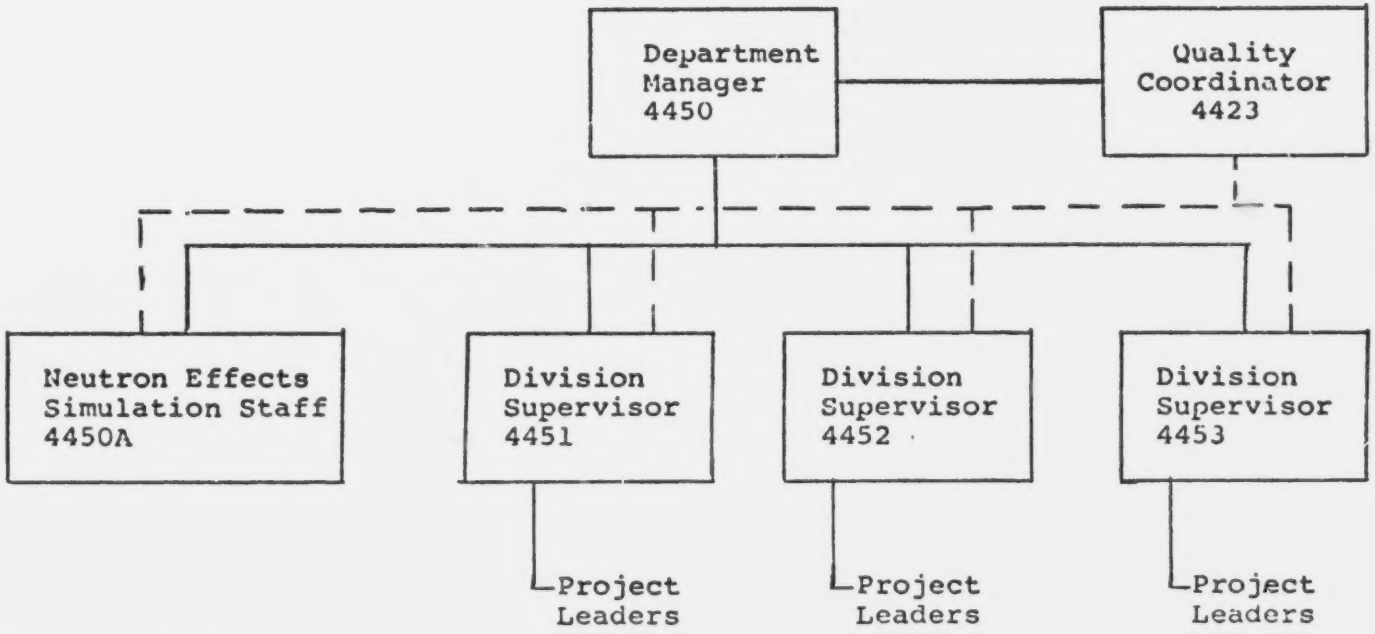
The Sandia National Laboratories, Albuquerque, (SNLA) organizational structure for RREP project/experiment activities are shown in Figures 1, 2, and 3. The responsibilities for administration and implementation of this plan are vested in the Department Managers, 4420 and 4450. The Quality Coordinator for RREP reports directly to the 4420 and 4450 Department Managers regarding quality assurance activities and has no responsibility for schedules and costs. He also has the necessary independence and authority delegated by the Department Manager to identify the quality problems, initiate or recommend

Figure 1 Department 4420



BLANK PAGE

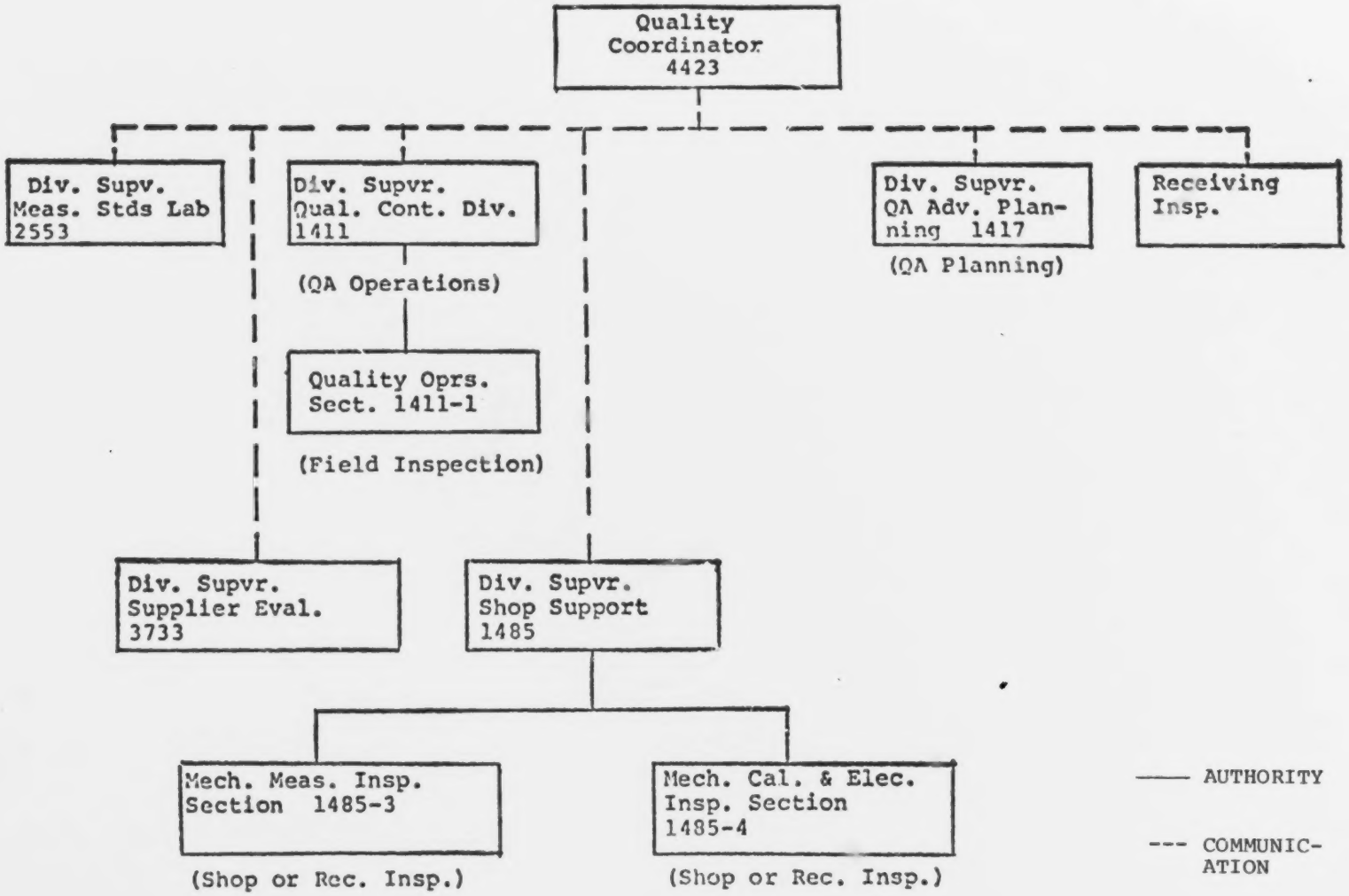
Figure 2 Department 4450



——— Authority

------- Communication

Figure 3 Major QA Support



corrective action, and verify the implementation of solutions for projects within the Department. His authority extends to stopping work when nonconformances occur until corrective action is taken, subject only to review by the Department Manager.

2. Responsibility and Authority

2.1 General Responsibilities and Authorities

The establishment and execution of the RREP Quality Assurance Program involve the following major responsibilities:

a. Preparation of QA Program Plan.
b. Preparation of documented procedures for task accomplishment and control.
c. Implementation and control of a quality program in accordance with the QA program plan for all RREP tasks.

The 4420 and 4450 Department Managers are responsible for the establishment of organizational structures, for the preparation, implementation, and monitoring the RREP Quality Assurance Program which includes an adequate communication link between the RREP QA Group and supplier QA organizations. The 4420/4450 Departments are also responsible for the following:

a. Development of detailed implementing procedures and/or instructions for their quality-related activities.
b. Compliance with all procedures and instructions for quality activities on Level I and other selected features of the Reactor Research Experiments program.
c. Establishment of qualification requirements and training programs, as appropriate.

The RREP Quality Coordinator is responsible for the development, maintenance, and surveillance of the Quality Assurance Program.

He also has the responsibility of assuring that SNLA suppliers have developed and implemented effective quality assurance programs in accordance with SNLA contractual requirements. He further has the responsibility of verifying that purchased products and services meet SNLA technical contractual requirements. Verification of conformance to established requirements shall be accomplished by individuals or groups which do not have direct responsibility for performing the work being evaluated.

2.2 Specific Responsibilities and Authorities

a. The following summarizes the major tasks and responsibilities of the RREP Quality Coordinator:

1. Develop and control the QA Program Plan and its distribution.

2. Review and approve purchase requisitions for technical and quality requirements.

3. Participate in supplier evaluations.

4. Evaluate quality data.

5. Audit of and surveillance over SNLA and supplier quality-related activities.

6. Participate in design reviews and verifications.

7. Verify conformance to quality requirements and design specifications.

8. Specify and maintain necessary QA records for document repository.

9. Review and approve supplier QA Program.

10. Review drawings and specifications.

11. Review and approve detailed procedures and instructions prepared by other SNLA groups to implement QA program.

12. Followup on corrective actions.

13. Prepare special management reports.

b. RREP Departments 4420 and 4450

1. Prepare design documents with quality requirements, including changes thereto.

2. Prepare and issue purchase requisitions.

3. Participate in technical evaluations of suppliers and bid proposals.

4. Maintain surveillance of supplier's progress.

5. Participate in QA audits.

6. Review and make disposition of nonconformances.

7. Develop and maintain a Records Management System with adequate facilities.

8. Assign personnel who perform quality-related activities to indoctrination and training courses.

9. Develop and control the Project/Experiment Quality Plan and its distribution.

3. Quality Assurance Interfaces

The Quality Coordinator will interface with RREP project management, purchasing, and all necessary SNLA service and support organizations, in the performance of their quality-related functions. Purchase requisitions and other quality-related documents will be reviewed for adequate quality requirements and will require approval by the Quality Coordinator. He will also interface through the responsible SNLA contracting representative with supplier quality organizations or representatives to assure that their QA programs are adequate and effective. He will interface with SNLA Corporate Quality Assurance in matters related to Corporate Quality Assurance Audits and overall compliance with Corporate QA Directives.

II. QUALITY ASSURANCE PROGRAM

1. General

The Quality Assurance Program defined in this program plan conforms to the format of 10CFR50 Appendix B. The plan and its related procedures provides for the creation of individual project/experiment quality plans (PEQP) under this overall umbrella plan. Such PEQP's will identify the applicable safety-related or Level I features and the necessary requirements to assure control. Additional quality levels and related elements for control are also identified.

Administrative control of the Quality Assurance Program is established and implemented by written procedures, by a personnel training program for personnel performing quality-related activities, and by program surveillance. Decisions relative to quality are made at appropriate organizational levels, and the 4420 or 4450 Department Manager has the final authority to resolve all disputes involving quality-oriented matters.

2. Program Documentation

The quality policies, requirements, and responsibilities which govern the various quality levels of project/-experiment features are contained in this program plan. This plan is approved by the 4420 and 4450 Department Managers for use at all levels where quality-related activities are performed. The assigned responsibilities are described in Section I of this plan. Applicable quality requirements will be specified in contracts with SNLA suppliers and on instructions to internal SNLA organizations. The implementation details for the quality program are contained in procedures and instructions. An index of procedures is contained in Appendix A. These are written in such a way that they include the normal SNLA activities and thereby minimize any perturbations to the manner in which Sandia conducts business. Each procedure has been given a numerical identification which relates it to the major quality element of this QAPP.

Controlled copies of this QA Program Plan will be distributed to all organizations having a need for a copy. Revisions will be distributed and controlled in the same manner as the original issue.

3. Program Implementation

Controlled conditions shall exist when quality-related activities are performed and these shall include proper equipment, trained personnel, suitable environmental conditions, and the meeting of all test and inspection prerequisites. Each Project Leader/Experimenter is responsible for assuring that the tasks assigned are performed in accordance with controlled written procedures which conform to the policies and requirements of this program plan.

4. Training

Training is conducted in orientation briefings that are held on an as-needed basis to acquaint RREP personnel on operation and use of the quality assurance program defined herein. The Quality Coordinator will schedule and conduct these briefings and maintain records of attendees.

5. Identification of Safety-Related Features

Features of the Reactor Research Experiment programs which are related to public health and safety will be identified in accordance with written procedural guidelines.

III. DESIGN INFORMATION, REVIEW, AND CHANGE CONTROL

1. Design Information

Written procedures provide for the proper selection of suitable materials, parts, equipment and processes by the design engineer. These procedures also provide guidance for selection of commercial (off-the-shelf) items. Verification of proper selection shall be a part of the design verification performed per 2, below.

2. Design Verification and Peer Reviews

Design verification activities when required shall be performed in accordance with written procedures which identify the responsible personnel or groups and which control their authority and responsibilities. The actual design verification activity shall not be performed by the originator or his immediate supervisor; however, the next higher level of supervision may be used in those cases where no other peer-level personnel are available within SNLA. A design review or, as a preferred method, a qualification test of a prototype unit (Qualification Sample) wherever feasible, or both, will be used for design verification depending upon the nature of the design and as agreed to by both the Project Leader/Experimenter and the Quality Coordinator.

Peer reviews shall be held as necessary to verify the effectiveness and acceptability for use of unofficial documents such as test procedures, plans, reports, etc. These reviews shall be documented.

Verification shall normally be accomplished by individuals or groups who do not have direct responsibility for performing the work being verified.

3. Design Definition

SNLA design activities are performed in accordance with a definition control procedure and with the general policies, requirements and procedures specified for normal Sandia National Laboratories Albuquerque operations. Technical and Quality requirements are established by the project/experiment organizations after due consideration of all design factors and are translated into operational plans or drawings and specifications by the SNLA Design Information Center. Drawings and specifications are prepared per the Sandia Laboratories Engineering Drawing System Method 3A or B.

Adequacy of the design and quality information on the documentation is assured by appropriate reviews and approvals by both the cognizant Project Leader/Experimenter and the Quality Coordinator. Changes to the drawings and specifications require the same levels of approval as the originals and change control is exercised by the original design group or a qualified alternate organization.

4. Design Interfaces

Where appropriate, design interfaces shall be identified and controlled by the Project Leader/Experimenter and will be handled in accordance with written procedures. These procedures provide for the proper documentation of design interfaces and changes thereto as well as a means of coordination among participating design organizations.

IV. PROCUREMENT DOCUMENT CONTROL

1. Procurement Practices

The SNLA Directorate of Purchasing and Materials Management is responsible for the acquisition of materials and services from other contractors or agencies for the Reactor Research Experiment Programs. Adequate control of the SNLA purchasing activities is assured by internal audits.

Procurement documentation at the Project/Experiment level is initiated on a Purchase Requisition (PR) containing both the technical and quality requirements. Conversion to a purchase order or contract is accomplished by the SNLA Purchasing organization. For the Reactor Research Experiment Programs, the Quality Coordinator will review and approve all Level I and II material purchase requisitions (PR's) to assure that adequate quality requirements have been included; that all necessary document submittal requirements are listed (see Sect. XVII); that proper instructions have been given storage, transmittal, or disposal; any special requirements are clearly delineated; and that the right of access to supplier's facilities for inspection and audit has been assured. Changes are subject to the same review requirements as the original PR. In addition to special requirements which are given in the body of the procurement document, Standard Terms and Conditions are always imposed upon SNLA contractors which delineate the duties and obligations of the contractor with regard to such quality-related activities as stop work orders, inspection, and examination of records.

2. Procurement of Spare or Replacement Parts

The procurement of spare or replacement Level I or other applicable materials will be subjected to QA program controls, to codes and standards, and to technical requirements equal to or better than the original technical requirements, or as required to preclude repetition of defects.

V. INSTRUCTIONS, PROCEDURES, AND DRAWINGS

Documentation for the accomplishment of Level I (critical) and certain additional activities on the project/experiment shall be provided through written instructions, procedures, or drawings. Such documentation shall include but not be limited to:

-- Project/Experiment Procedures
-- RREP Quality Assurance Program Plan
-- Drawings
-- Specifications
-- RREP Scopes of Work/F-orders
-- Operations Plans

RREP documents are prepared, reviewed, approved and issued in accordance with established policies and procedures. RREP instructions and procedures will be prepared by the Project/Experiment Groups and Quality Coordinator as required and will be reviewed and approved for applicability of QAPP criteria. Document changes are controlled in the same manner as the original document. Quantitative and qualitative criteria shall be specified on the documentation, where appropriate, for verification of satisfactory accomplishment of Level I and certain additional activities. Procedures and instructions applicable to the RREP Quality Assurance Program are identified in Appendix A.

VI. DOCUMENT CONTROL

The RREP Document Control System shall function per written procedures which embody the following requirements:

a. Personnel or organizations are identified who are responsible for the preparation, review, approval, and distribution of documents.

b. The same controls are applied to document changes as are in effect on the original issue.

c. Interfacing documents are properly coordinated and controlled.

d. A formal document change system is in effect wherein either a changed document or an unchanged document plus a formal change order or its equivalent is available prior to change implementation.

e. A control technique is in use which provides a ready reference to the current issue of all documents.

The responsibility for assuring that the latest issue of all documents is used to accomplish a given quality-related activity rests with the concerned Project/Experiment Group. An activity will not start until all required documents are readily accessible at the work location. The Quality Coordinator shall verify these requirements by surveillance and audit techniques.

As a minimum, the documents to be controlled under the provisions of this section include the following:

a. RREP Project/Experiment Procedures
b. RREP Quality Assurance Program Plan
c. Purchase Requisitions
d. Test Procedures
e. Drawings and changes thereto
f. Specifications and changes thereto
g. Nonconformance Reports

VII. CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

1. Supplier Evaluation

Supplier evaluations shall be performed prior to the award of the contract on all Level I materials and other materials as deemed necessary by the Project Leader/Experimenter. The evaluation shall be made by qualified personnel in accordance with written procedures and shall be based upon either a review of, or experience with, previously satisfactory records of performance or a survey of the potential supplier's facilities and his QA program. The evaluation shall determine the supplier's capability to provide a product or service which meets SNLA requirements (Design & QA) and to comply with the applicable criteria of this QAPP.

When a survey is selected as the basis for supplier evaluation, it shall be conducted by the Supplier and Laboratory Evaluators in the Purchasing Planning Division of SNLA with optional participation by the RREP Quality Coordinator or his designated representative.

The results of supplier evaluations shall be documented, filed and retained as long as the supplier is a current or prospective procurement source.

2. Surveillance and Auditing

During the fabrication of Level I (critical) materials (and otherwise as deemed necessary) the effectiveness of a supplier's quality control and his conformance to specifications shall be evaluated by the Quality Coordinator or his designated alternate. These evaluations shall be done in accordance with written procedures and shall be accomplished by audits or surveillance methods at a frequency and scope dependent upon the nature and quantity of the items or services being evaluated. The written procedure for supplier surveillance and source inspection provides for:

a. Identification of features or activities to be surveyed, witnessed, inspected or verified (Quality Operations Instruction, QOI).

b. Method of accomplishment.

c. Extent of documentation.

d. Documentation and resolution of deficiencies.

e. Quality verification reports which also authorize shipment, as applicable.

3. Receiving Inspection

Receiving inspection of procured Level I materials and others when deemed necessary shall be performed in accordance with documented procedures and shall be based upon existing inspection instructions or upon Quality Operations Instructions (QOI's) furnished by Corporate QA, Dept. 1410. Such instructions shall be supplied to the Receiving Inspection Division prior to or at the time of receipt of material. Suppliers of Level I materials shall be required to furnish documentation that identifies purchased materials and the specific procurement requirements, standards and specifications were met. Provisions shall be made to require the selective verification of raw material certifications by independent testing.

4. Evaluation of Bids

The evaluation of bids and award of contracts are performed in accordance with RREP written procedures. The results are documented and filed.

VIII. IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

Identification and control of materials, parts, and components shall be accomplished, as required, by means of a documented part-numbering system which is normal to SNLA operations. The system provides for the estabishment of the identification requirement during drawing preparation with a continuing and traceable record both on the item and the paperwork to preclude the use of incorrect or defective items. Marking on the items is employed wherever feasible and its location is such that it will have no effect on fit, function, or quality. Quality Program requirements to be imposed on suppliers shall require methods and facilities to control the identification, handling and storage of raw fabricated materials from the time of receipt until delivery of completed product. Verification of identification on critical materials, parts, and components shall be the responsibility of the Quality Coordinator or his designated qualified alternates.

Some of the SNLA tasks can be expected to require special identification procedures. In those cases, the procedures for identification and marking shall be contained in the design specification for the activity and will be monitored and/or verified by the Quality Coordinator as described in this program plan.

IX. CONTROL OF SPECIAL PROCESSES

If a special process such as welding, heat treating, plating, nondestructive examination, etc., is required at SNLA in support of the RREP activities, qualified personnel using approved procedures and equipment shall be used in accordance with normal SNLA practices.

With regard to outside purchases, the responsibility for control of special processes is delegated to the SNLA suppliers through individual purchase orders. These procurement documents shall require suppliers to establish and implement appropriate controls on special processes. The Sandia Supplier and Laboratory Evaluation group shall be requested to review and approve a company's special processes when a Level I (critical) material or feature is involved, and/or when Sandia Process Standards and/or Military Specifications/Standards are a part of the product requirement. The suppliers' control of these processes shall be monitored and/or audited as required by the Quality Coordinator or his designated qualified alternates.

X. INSPECTION

SNLA inspection for both internally manufactured items and source/receiving, unless inspection is waived in writing by the Quality Coordinator, provide detailed inspection reports.

Inspectors qualified in accordance with RREP procedures shall normally be assigned from SNLA organizations that are closely related to the inspection activities to be accomplished rather than from the project/experiment group. For example, Field Quality Representatives from the QA Operations Section will be assigned to source inspection activities when field inspection is specified in the contract. In this manner, the independence of SNLA inspection personnel is assured.

SNLA Procurement documents for Level I (Critical) materials/-features and services as otherwise deemed appropriate by the Project Leader/Experimenter in conjunction with the Quality Coordinator include requirements for a supplier inspection program. The suppliers' program will provide for written controlled inspection instructions to be used in verification activities associated with the various stages of the work and will also provide for the use of qualified independent inspection personnel.

The Quality Coordinator or his designated qualified alternates through independent auditing, surveillance and inspection functions, will assure that the procedures and practices used during project activities are adequate to accomplish the task and are effectively implemented.

XI. TEST CONTROL

The responsibility for suitable test programs lies with the responsible assigned RREP Project Leader/Experimenter and/or the individual cognizant engineer. Test requirements shall be specified in applicable specifications or other special program documents.

Written RREP test plans and/or procedures shall be subject to the review and approval of the Quality Coordinator and, as appropriate, shall contain:

a. Test prerequisites.

b. The identification of the instrumentation and equipment required.

c. Methods for data collection and handling, including required data sheets, if applicable.

d. Operational requirements such as preliminary calibrations, special environmental conditions, safety precautions, cleanliness details, etc.

e. Adequate instructions for performing the test. If applicable, this shall include criteria for approval or rejection of the test or test item.

f. Requirements for specially trained, qualified and licensed or certified personnel. This will include provisions for independent inspection and/or monitoring personnel if independent inspection/monitoring or data authentication is required.

When a test program is required at a supplier's facility, SNLA procurement documents will contain appropriate test control provisions. Where supplier-developed procedures are required to support acceptance requirements for Level I materials, such procedures shall be submitted to Sandia for review and approval and for the insertion of appropriate witness points. If a test item is modified or required during or after the test sequence, it will be tested again in accordance with the original specification or an acceptable alternate.

Test results shall be documented and their acceptability shall be determined and concurred with by the test requester. Verification that adequate test control measures have been taken and the results have been accepted shall be the responsibility of the Quality Coordinator and shall be accomplished through auditing and surveillance procedures.

XII. CONTROL OF MEASURING AND TEST EQUIPMENT

The SNLA Measurement Standards Laboratory is the central point of authority for all matters related to the calibration of equipment, gages and standards. This group controls the internal SNLA calibration program (error of no more than 1/4th of the tolerance of the equipment being calibrated, except for state-of-the-art situations) and provides consultation and related services concerning SNL procurement matters. The Calibration Program at SNLA is documented per written procedures.

The SNLA Project Calibration Procedures provide for the calibration of measuring and test equipment against appropriate standards which are linked to the National Bureau of Standards. The procedures also provide for the instruments to be entered in an appropriate recall system for periodic calibration or maintenance; for written equipment calibration procedures; and for calibration data which is traceable to the equipment calibrated. The calibration status

of the equipment is recorded and tags or stickers are used on the equipment which show the date of the next calibration. The above controls will be applied to tooling when used as a media of inspection.

The Quality Coordinator through the normal internal and external audit, surveillance and inspection functions, will assure that the procedures and practices used during project activities are adequate and effectively implemented.

XIII. HANDLING, STORAGE, AND SHIPPING

Handling, storage, and shipping requirements shall be accomplished per written procedures. Controls, as necessary, to preclude damage, loss, or deterioration due to environmental conditions, shall be specified in this documentation. When special treatment is required, the technical specification shall specify the requirements and shall provide for their accomplishment.

Procurement documents for manufactured safety related items will include appropriate requirements for handling, storing and shipping, including cleaning, packaging, and preservation of materials to prevent damage and deterioration and loss. Procedures shall be provided for marking and labeling and for packaging, shipment and storage of items.

The Quality Coordinator through the normal internal and external audit, surveillance, and inspection functions will assure that the procedures and practices used during project activities are adequate and effectively implemented.

XIV. INSPECTION, TEST, AND OPERATING STATUS

The nature of the inspection, test, and operating status of materials and test items for the various projects/experiments is individually determined and will depend on the special circumstances involved. Test procedures, as necessary, will address special status indication symbols or special identification procedures.

The identification of the inspection, test, and operating status of purchased Level I and other applicable items is controlled by procurement documents. Suppliers are required to provide suitable methods and facilities to control raw and fabricated materials from the time of receipt until delivery of the finished product.

The Quality Coordinator, through the normal internal and external audit, surveillance and inspection functions, will assure that the procedures and practices used are adequate

and effectively implemented. Waivers of inspection shall be approved by the Quality Coordinator and nonconformance status shall be properly identified.

XV. NONCONFORMING MATERIAL

Written procedures provide for the documentation of nonconforming material and for the notification, review and disposition of the problem. The RREP Project Leader/Experimenter is identified as responsible for disposition decisions and for required internal coordination. Disposition approval shall be provided by both the Experimenter and the Quality Coordinator. Provisions are made to authorize project rework to meet specific project definition requirements. All nonconforming material, including test failures, will be processed in accordance with these procedures and the resulting documentation will be retained. Reworked, repaired, and replacement items will be inspected and tested in accordance with the original inspections and test requirements or acceptable alternatives.

Externally, procurement documents for items require positive identification of nonconforming material and the prompt and continued segregation from other material being processed or stored. Product disposition is handled as noted above and the resulting documentation will remain a part of the data package associated with the item.

The Quality Coordinator, through the normal internal and external audit, surveillance and inspection functions, will assure that the procedures and practices used are adequate and effectively implemented.

XVI. CORRECTIVE ACTION

Nonconformances or other defectiveness adverse to quality shall be evaluated by the cognizant RREP personnel, and the need for corrective action shall be determined in accordance with written procedures. The Quality Coordinator shall take appropriate action to assure the following:

a. Prompt initiation of corrective action to preclude recurrence.

b. Verification of proper implementation as determined necessary, by follow-up reviews.

c. Documentation of significant conditions, their cause, and the corrective action taken in a report to the proper management levels.

The Quality Coordinator shall be responsible for verification that the corrective action process is working. He will do this by surveillance and auditing techniques.

XVII. QUALITY RECORDS

Sufficient records shall be prepared as work is performed to furnish documentary evidence of the activities and services affecting quality. Records shall be consistent with applicable standards, drawings, specifications, and contracts and shall be adequate for use in management of the quality program.

Quality assurance records include, but are not limited to, drawings, specifications, instructions, change orders and modifications, nonconformance reports, contract documents, procedures, analyses, inspection-test and audits results, logs, etc. Technical reports containing results and conclusions drawn from data generated shall be subjected to a peer review by qualified individuals, or groups other than those who prepared them, prior to issuance and retention in the document depository. The reviewing person(s) may be from the originating organization but shall generally not be the immediate supervisor of the one(s) who prepared the documentation.

The responsible RREP Project Leader/Experimenter is responsible for maintaining a records depository as part of the Division files. Records shall be identifiable and retrievable. All quality assurance records shall be retained and become a part of the overall record retention system of the project/experiment. Records are classified for either permanent retention (the end of the year at which the final project/experiment takes place plus one additional year) or for non-permanent (time specified by program procedure) retention.

Inspection and test records shall contain the following, where applicable:

1. A description of the type of observation;
2. The dates and results of the inspection or test;
3. Information related to conditions adverse to quality;
4. Inspector or data recorder identification;
5. Evidence as to the acceptability of the results;
6. Actions taken to resolve any discrepancies noted.

XVIII. AUDITS

Planning and implementation of the audit program are under the direction of the QA coordinator. Audits will be performed by the Quality Coordinator and other designees. Such audits will evaluate the implementation and effectiveness of the QA Program as it applies to the Reactor Research Experiment Programs. Audits and results will be documented.

Appendix A -- Applicable Documentation

1. NUMERICAL INDEX OF PROCEDURES

The procedures listed below are intended for use in implementing the RREP Quality Assurance Program Plan (QAPP). This list is subject to revision, addition, deletion, etc. as procedures are updated, new procedures are developed, and/or new methodology is required.

RREP No.	Procedure Title	Revision No.
I-1	QA Procedure Format and Preparation	A
II-3	Three-Level QA Program	A
II-4	QAPP Controls and Revisions	A
II-100	Project/Experiment Quality Plan	A
III-2	Design Review Procedures	A
III-3	Design Information Sources	A
III-4	Design Definition System	A
IV-3	Procurement of Materials and Services by Purchase Requisition	A
IV-4	Procurement Practices	A
IV-5	Preprocurement Actions	A
IV-6	Procurement Factors	A
IV-7	Procurement Action Approval	A
IV-8	Disqualified Bidders and Ineligible Contractors	A
V-1	Process Flow Chart and Travelers	A
VI-1	Document Control System	A
VII-3	Single-Source/Single-Make Procurement	A
VII-6	Material Certifications	A
XI-2	Qualification of Test Personnel	A
XII-1	Calibration and Repair of General Purpose Laboratory Instruments and Measuring and Test Equipment	A
XII-2	Calibration Program	A
XII-3	Calibration of Equipment, Gages, and Standards	A
XII-5	Control of Measuring and Test Equipment	A
XIII-1	Handling, Shipping, and Storage Procedures	A
XIII-2	Property Movement	A
XIV-1	Status Indication of Items	A
XVII-1	QA Records Collection, Filing Storage, and Maintenance	A

2. NUMERICAL INDEX OF ENGINEERING PROCEDURES (EP)

The procedures (EP's) listed below are available for use with the RREP Quality Assurance Program Plan (QAPP). Copies may be obtained from SNLA film banks, and they are intended for use as applicable for conveying requirements to outside suppliers by being specified in 4420 and 4450 Purchase Requisitions.

No.	Title
EP401201	Control of Contractor's Documents Under a Development Contract
EP401207	Control of Design Prototypes Under a Commercial Development Contract
EP401401	Qualification Evaluation System for Commercial Suppliers
EP401405	Certification and Submittal of Product
EP401408	Inspection Program Requirements
EP401409	Raw Material Testing and Quality Evidence
EP401412	Calibration of Contractor's Standards
EP401413	Field Operations Representative Support
EP401414	Quality Program Requirements (10CFR50 App. B)

3. ADDITIONAL QUALITY-RELATED DOCUMENTATION

a. Sandia Laboratories Engineering Drawing System (SLEDS) Manual, dated May, 1978.

b. Nuclear Fuel Cycle Programs, Document No. QP1-PFL, dtd July 2, 1981 -- Subject: Quality Guidelines for Processing Reactor Experiment Hardware.

c. Process Control of Manufacture of Nuclear Experiment Hardware, Document No. SS-T76398, dtd July 17, 1981 -- Subject: Quality and Manufacturing Requirements for Outside Fabrications.

Distribution:

USNRC Distribution Center (CDSI) (300 copies)
7300 Pearl Street
Bethesda, MD 20014
275 copies for R7
25 for NTIS

R. L. Seale
University of Arizona
Dept. of Nuclear Engineering
Tucson, AZ 85721

R. S. Thomas, LASL, HDO
R. E. Peterson, LASL, ADA
T. F. Wimett, LASL, Q Div.

1410 W. C. Kraft
1411 W. P. Thomas
1417 F. L. McFarling
1470 R. W. Wilson
1472 E. R. Frye
1473 T. P. Conlon
1480 J. R. Sublett
1481 J. F. Gonzales
1482 E. L. Arterburn
1483 P. W. Plomp
1485 A. E. Hall
1485 R. E. White
1537 N. R. Keltner
1541 M. L. Shannon
1551 D. W. Ballard
2452 J. R. Harrison
2452 W. J. Lutgen
3310 W. D. Burnett
3312 G. E. Tucker
3312 R. B. Stump
3441 G. S. Wallace
3442 M. Carroll
3715 G. T. Kupper
4000 A. Narath
4230 J. E. Powell
4232 L. D. Posey
4400 A. W. Snyder
4410 D. J. McCloskey
4420 J. V. Walker
4421 R. L. Coats
4421 K. R. Boldt
4421 D. N. Cox
4421 G. W. Fieg
4421 J. E. Gronager
4421 J. T. Hitchcock
4421 H. Meister
4421 G. W. Mitchell

4421 C. A. Ottinger
4421 K. Takahashi
4422 D. A. Powers
4422 J. E. Brockmann
4422 R. M. Elrick
4422 J. D. Fish
4422 T. M. Kerley
4423 P. S. Pickard
4423 J. Garcia
4423 G. L. King
4423 A. C. Marshall
4423 D. A. McArthur
4423 D. G. Pipher (10)
4423 K. O. Reil
4423 N. C. Simmons
4423 S. A. Wright
4424 M. J. Clauser
4425 W. J. Camp
4426 G. L. Cano
4426 J. G. Kelly
4426 J. F. Schulze
4426 K. T. Stalker
4440 D. A. Dahlgren
4441 M. P. Sherman
4442 T. E. Blejwas
4443 J. A. Letz
4444 L. N. Kmetyk
4445 L. D. Bustard
4450 J. A. Reuscher
4450A L. M. Choate
4450A T. Luera
4451 T. R. Schmidt
4451 D. T. Berry
4451 S. Domingues
4451 B. F. Estes
4451 F. M. Morris
4451 Z. L. Zubersky
4452 M. F. Aker
4452 J. W. Bryson
4452 I. D. Hamilton
4452 D. C. McKeon
4452 J. S. Philbin
4452 R. E. Stinebaugh
4452 C. W. Tucker
4452 D. W. Vehar
4453 W. J. Whitfield
4453 D. J. Sasmor
4550 R. M. Jefferson
5521 S. N. Burchett
5821 N. E. Brown
5822 K. H. Echelmeyer
5835 C. H. Karnes
5836 F. J. Zanner
5846 E. K. Beauchamp
8300 B. F. Murphey
8214 M. A. Pound
3141 L. J. Erickson (5)
3151 W. L. Garner (3)

Org.	Bldg.	Name	Rec'd by	Org.	Bldg.	Name	Rec'd by

Sandia National Laboratories